Talking Script

RETRIEVAL OF WRITTEN DOCUMENTS BY DESCRIPTION OF SCRIPT FEATURES

Documents in databases can be retrieved by appearance by one of the following methods: visual (using a reference document), semantic (describing script features), haptic (by drawing) and exogenous (from metadata about the writers). Semantic retrieval is convenient because it is intuitive (it takes place via a graphical and natural-language interface), free of any preexisting model (not always available) and can describe parts of the script (contrary to the holistic approach of visual retrieval). We present here a prototype of a semantic script retriever.



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[1] An anisotropic Gaussian filter bank with one degree radial resolution is applied to the binary contours of the script image to obtain the local orientation at each contour pixel. [2] Statistical properties of the resulting distribution are computed. [3] Experimentally it is found that these computational measurements relate to perceptually meaningful individual script features.



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 Handwriting samples from IAM OffLine Handwriting Database 3.0
 Poster manufacturing courtesy of Graphem
 Kumagoro Design

 http://www.iam.unibe.ch/fki/databases/iam-handwriting-database/
 http://liris.cnrs.fr/graphem/
 http://alum.mit.edu/www/atanasiu/

PRÉSENTATIONS DE PROJETS

Rex Online

(V. Atanasiu)

What is Rex?

Rex is an online browser for collections of written documents [1]. Aside this core function it has however many other applications that make it interesting for digital palaeography and graphonomics. The purpose of this paper is to present these applications.

Technical papers about the tool are available on *Rex*'s website, as well as the software used to process the documents. There is one dataset presently accessible [2], but others can be added and the interested parties are encouraged to contact the author.

How does Rex work?

In *Rex* you can browse documents according to some criteria describing in an intuitive manner the visual appearance of the script, such as degree of character slant, roundness or density (see the overleaf figures). These descriptors are based on mathematical properties of a single script feature, that of the orientation of a tangent along the script contour [3].

The technical beauty of *Rex* is to have revealed correlations between mathematical and graphonomical concepts, between logic and perception. Form a user perspective its appeal is the use of common language through which browsing takes place.

What is Rex useful for?

The main application areas of *Rex* relate to aspects of digital librarianship, study and teaching of graphonomics and the development of software for digital graphonomics.

Digital librarianship

1. *Dataset browser* — As mentioned above *Rex* allows the browsing of datasets according to selected script characteristics. It is hoped that this capability will get software developers more interested in the documents they work on, which has a beneficial impact on the developed tools.

132 — Gazette du livre médiéval, nº 56 — 2011, fasc. 1.

2. Document retriever — If one searches for a specific subpopulation or even single document in a dataset, *Rex* can also be used as a document retriever (hence it's canine name). In this it differs from many document retrieval systems needing an image as input, since interaction happens through words. Thus you can pinpoint to a particular aspect of the script, what with an image you obviously can't.

3. *Quality control* — *Rex* was already used to identify misclassifications in the present dataset. An automated check backed by a visual one found that a few documents written by some writers were erroneously classified with those of others.

· Study and teaching of graphonomics

While *Rex* will appeal to researchers as an investigative tool, it should also be useful to teach graphonomics, in particular due to its visualization capabilities.

4. *Writer characteristics* — Through *Rex* users can access single documents as well as all documents of a single writer, allowing the examination of within and in-between writer variability, an important information for writer identification and verification.

5. *Population characteristics* — A visualization of the script profiles of all documents in the dataset in a single image is also provided by *Rex*. It helps the comparison of datasets and exploration of the writer demographics.

6. Understanding script features — Analytical script descriptors, and to some degree the intuitive ones, used in writing analysis software have properties that are not fully understood. For example it was surprising how many different aspects of a script can be seen in the contour orientation profile used by *Rex*. It was also found that scripts looking radically different can have the same profile [4]. Using *Rex* and thinking about what it does can help software developers and writing experts alike better understand analytical and intuitive features, an essential keystone of their intellectual products.

Software development

7. Human-computer interfaces for graphonomics software — It was already mentioned how the use of navigation by words rather than by images can change what can be achieved with a graphonomics tool. Using *Rex* as a testbed, there are many other issues that can be investigated, such as colormaps, display of pictures and information on the limited screen space, information to provide, terminology, etc.

8. *User needs* — Using *Rex* and developing other graphonomics tools while learning from Rex, acts as a translator between the user and developers. They have a model to comment on while creating new products.

Conclusions

There aren't many software available off-the-shelf to writing experts today. Therefore it is encouraging that even technically simple solutions can have many useful applications for graphonomics if they are conceived with the users' needs in mind and developed beyond the prototype stage. Other papers in this volume, by G. Vogeler and P. Stokes, also underscore the pluralistic usage propensity of online palaeographic projects. May Internet save Palaeography!

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FIG. 1. — Documents in databases can be retrieved by appearance by one of the following methods: visual (using a reference document), semantic (describing script features), haptic (by drawing) and exogenous (from metadata about the writers). Semantic retrieval is convenient because it is intuitive (it takes place via a graphical and natural-language interface), free of any preexisting model (not always available) and can describe parts of the script (contrary to the holistic approach of visual retrieval).



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FIG. 2. — Handwriting samples from IAM OffLine Handwriting Database 3.0 http://www.iam.unibe.ch/fki/databases/iam-handwriting-database/